

Jeff attempts to contact The
ARMOUR STAR
via HAM Radio

HAM RADIO!

avast!

All right, Techies. I sound the horn, throw down the gauntlet, push the panic button and issue the first general challenge in the history of General Technics. It's time for all you computer hackers, micro maniacs, digital groupies, and junior demolitions experts to pull together and help create something really terrific. It's something that, alas, can be created by no one man alone. It's the thing we've bandied about almost since the beginning, and have gotten virtually nowhere on: the Technie Talkie.

I'll give it to you straight. I can't do it myself. Not because of difficulties in engineering or time or money. It's the old story of one hand clapping; one Technie Talkie is about as worthless as commercial television; you may hear some noise, but there will be no communication.

In time, we might be able to come up with a technie talkie kit in the 100 dollar price range. The way I read it, the merest handful will be able to afford that. And the Technie Talkie Network is something that cannot be effective in the hands of a couple of rich techies. One member, in a brief note, put it very well: "Technie Talkies will be worth it if lots of people have them."

Amen. What we have here, then, is a motivational problem, far more than one of dollars and sense. As a black box appliance costing 100 beans, only a few people will consider the TT worth it. What we need is access to a reservoir of less expensive radio gear, but more importantly, we need to tap some reservoir of dedication and interest in radio. I know damned well that, for all the digital expertise floating around GT circles, there is very little knowledge of matters linear. To make the TT work you need to know a little bit about RF, and you need to join the radio Gestalt.

Yes, it exists. It's called Amateur Radio.

I am not going to go the usual route and paint glowing pictures of the incredible things ham radio ops can do. I will gloss over briefly the cheap gigahertz range radio gear and the established technology of amateur television for less than five hundred bucks. I won't even mention the two, soon to be four satellites available to ham ops as spacegoing repeaters for communicating all over the goddamned world on microwaves. No, I will limit myself to the bare fact that if most of the active membership of General Technics does not get into ham radio, the Technie Talkie concept is dead. Period. For-frigging-ever.

We already have the beginnings of a Technie Talkie Network. Several networks, in fact. I have transmit and receive capabilities on seven separate radio bands from three megs to 144 megs. So does George Ewing. So does Neil Preston. So does Ed Back. Our Technie Talkie Network could span a single motel, or it could span the country. If we pushed a little, it could span the world.

Cost. Yes. The FM handheld I carry with me at cons sometimes is the cream of the crop; fully outfitted it's worth close to four hundred bucks. However, they can often be had for a hundred or less, used, and there is at least one kit talkie for a hundred and a quarter. And those are just handhelds. You may have heard of things called Sixers and Twoers. A Sixer is a complete radio station operating at 50 Mhz. I bought one in fine working shape at a hamfest for ten bucks by doing a little nagging. Average price is about twenty bucks at most. A twoer is the same, save that it works at 144 Mhz. Both are a little smaller than a kid's lunchbox. If you can't afford a Twoer, you aren't interested in Technie Talkies.

Some people think that radio technology is obsolete, merely because a lot of radio gear uses tubes. Crap. Radio technology is at least as important as computer technology, and probably moreso; it is more fundamental. If you think all of our phone traffic goes over wires, you're still living in 1946. As people interested in space travel we must know something of radio. It's damned hard to sink a telephone pole into hard vacuum. And I'll sneer at vacuum tubes when you show me a solid-state transmitter with an output of a quarter million watts.

It is easier to get a ham radio license now than ever before. It costs nothing, zip, zilch, nix to get a license from the government. The test is free and the form is free. You must take two tests to get a Technician ham license. You must take a test of theory and radio law that any fifteen year old with an ounce of brains could pass blindfolded, and you must receive Morse code at a rate of five words per minute. You need not send Morse Code at all.

The code receiving test used to be much worse. You had to sit down in a strange place with strange earphones on and copy one minute's worth of code (that's 25 morse characters) straight without a single error. You got five minutes worth sent to you, but if within those five minutes there was not one stretch of one minute straight without mistakes, you lost. The "butterflies factor" wasted a good many applicants over the last fifty years.

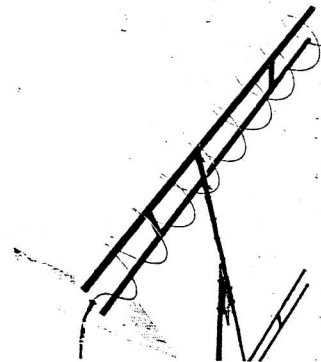


Fig. 22-20 - An 8-turn 432-MHz helical array, wound from aluminum clothesline wire. Left-hand polarization is shown. Each turn is one wavelength, with a pitch of 0.25 wavelength. Feed is with 50-ohm coax, through an 84-ohm Q section.

In order to allow examiners ignorant of Morse code to give the test, the FCC eliminated the sending test and made the receiving test easier. Nowadays you get five minutes of code. You copy it any way you want, and after the code you take a little test on the content of the message you copied. 70% passes. The emphasis is on getting the message, not on getting every last character down pat. I should mention that you do get to keep your copy-sheet in front of you for the test. It's not a memory quiz either.

The theory test is fifty questions. Some of them deal with the rules & regs of ham radio--no worse than your average to easy history test. You memorize it, and you spit it back. The remainder have to do with radio theory. The test has probably changed in the last couple of years, but in 1974 it was no big thing. You have to know something about oscillators and amplifiers, of transmitters and transmitting, radio wave propagation, Ohm's Law, resistors and capacitors in series and parallel. If you've ever passed a college physics test, it's in the bag. All you have to do is study a little. Even if you haven't, you can do it by reading the marvelous American Radio Relay League crib sheet books.

These books are often carried by school and community libraries. Look for them. They are also carried by many Co., radio, and electronics distributors, as well as larger bookstores. The single most important book to have is a current edition of The Radio Amateur's License Manual. This book has the complete text of all ham radio rules 'n regs, plus an extensive compilation of sample questions which virtually follow the actual test questions the FCC gives. This book is revised and updated frequently, so check to see that the copy you read or buy is reasonably current. This is your master crib sheet and study guide. It assumes a certain knowledge of the material and is not a radio course in itself.

more in that direction is Understanding Amateur Radio, also by the ARRL, which is laid out more as a beginner's course in the field. The style is footloose and easy, and the cartoons are genuinely funny.

I would suggest getting hold of these two books and looking them over. And in order to get you interested, this is generally how ham radio works:

There are several classes of license, starting with easy-to-get and working up to Utterly Miserable. Each grade gives you a little more ability to throw RF around. Novice class is bargain basement. Code speed requirement is 5 words per minute, and the theory test is very simple. For your trouble you get to use Morse code only on the shortwave bands. (3.5, 7, 21, and 28 Mhz.) Only slightly more difficult is the Technician license. Code test is exactly the same as Novice, but the theory test is a little harder. You have to know more about the rules, and more radio theory proper. But the jump in ability is big. You get to use FM, AM, single sideband, TV, and any other mode of emission above 50 Mhz.

The next three licenses are very similar. With General, Advanced, and Extra you get to do most everything everywhere hams are allowed to do it. Little snippets of certain bands are closed to Generals, smaller snippets are closed to Advanceds, and Extra gets the whole shebang and 2000 peak watts worth. That much power can--and will--take you to the Moon and back. The code requirements are stiffer--13 wpm for General and Advanced, and 20 wpm (ouch!) for Extra. Even your beloved Editor, fanatic ham that he is, hasn't been able to crack the Extra license yet. But don't let that worry you. Aim a little lower for the time being.

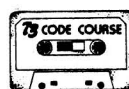
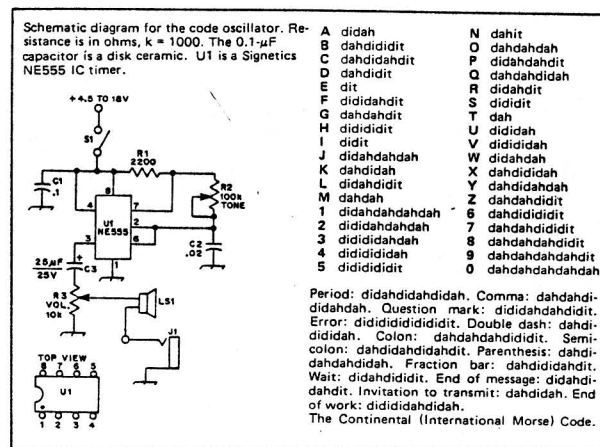
Get a Technician license. With that license you can buy a Sixer or a Twoer at a hamfest for twenty bucks, rig an antenna out of some aluminum rod, and be on the air for the price of a speeding ticket plus court costs. Admittedly, Sixers and Twoers are not continent-spanning radios. But they will get you across Chicago's metropolitan area, or Columbus. Six or eight people gathered on a frequency can be a riot, and is a splendid opportunity to test gadgets like TouchTone remote controllers and whatnot.

Then, once you've tried it, you'll probably be hooked. You'll start stashing away nickels and dimes and hunting for a good 2-meter FM radio, and the beginnings of a handheld Techie-Talkie net. Another idea might be to take one of the new 50Mhz kiddie-talkies ("licenseless" radios usually used to play Star Wars on street corners and other such rot) and convert them up a couple of Mhz to the 6-meter band. Right there you have a techie-talkie mainframe that won't cost you more than fifteen bucks, and can be modified as much as you are clever and willing to learn.

How to start? Go to the library. Get a book, any book, which contains Morse code. Memorize it. Not as dots and dashes, but as "dits" and "dahs." Go into the bathroom, stuff a towel under the door, and recite the alphabet in Morse. Do it forward, then do it backward. Then recite your name, and then the Gettysburg Address. Dan dah dan/dan di dan? Van dah dit/dan dah dah//dan/dan dan dan//di dit/dan!

You still have to learn how to receive Morse. The all-time best way to do that is to get one of the various code tapes floating around, plug it into your cassette player, and drum it into your head until you can copy it on paper without straining. 5 wpm is just a little faster than rote memorization speed, and it's a good idea to receive at seven wpm before trying for the test. Butterflies have snotted down better men than you. These tapes can be bought at many electronics stores, at all ham radio supply stores, and even at a couple of computer stores. Ask around. Maybe someone you know has one that you can copy. I do, for one. Anybody in Chicago can copy it from me. Elsewhere, you'll have to look around. But the tapes are available. Don't let it stop you.

If you have any access to an all-band radio, tune to 3.5 Mhz or 7.1 Mhz and hunt around until you hear some slow code. These are novice hams chattering away, and although the spelling may be miserable, copying down their conversations can be fascinating, and it's damned good practice to pick out dits and dahs from thunderstorm and electric toothbrush interference.



FOUR TAPES for \$15.95
\$4.95 EACH

5 WPM This is the beginning tape for people who do not know the code at all.

8+ WPM This is the practice tape for the Novice and Technician licenses.

73 Radio Bookshop • Peterborough, NH 03458.
Add \$1.00 shipping & handling charge for each order.

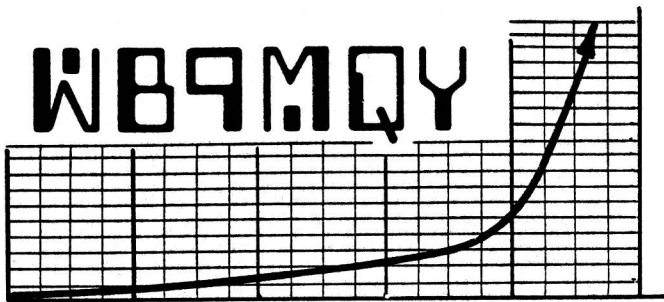
13+ WPM Code groups again, at a brisk 13 per so you will be at ease when you sit down in front of the steely eyed government inspector and he starts sending you plain language at only 13 per.

20+ WPM Code is what gets you when you go for the Extra Class license.

Then, practice. Practice! PRACTICE! Copy that stuff until you hear it in your sleep. You're shooting for 5 wpm, but if you find you're getting really good at it, shoot for 13. This will net you a General license, and is so much the better to have. But 5 wpm is the target.

While you're recuperating from Morse practice stints, study the sample-question material under the Technician section of the Radio Amateur's License Manual. True, it isn't that difficult, but it's embarrassing to pass the code test and then flunk the theory test. Study the Novice test material too--it's included in the Technician testing sequence. Calculators are allowed in the test, but they will probably watch you turn them off and on again to be sure nothing is stored in memory. The math is not difficult, however. Nothing worse than inverses and some square roots, at least on the Technician level.

Once you're absolutely sure you know the code and are familiar with the theory material, you go and take the test. There are FCC offices in most big cities, though you will have to search them out and call them up to find out where and when the tests are administered. You must fill out a government application form before you take the test. Form fee was once nine bucks--win or lose. It is now free--temporarily. Get it while it's cheap, people.



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KANSAS CITY, MISSOURI 64132
"Don't Quit Workin'"

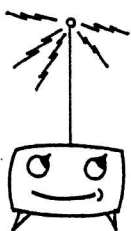
WB0DQW

NEIL R. PRESTON
7024 BALES

WN9MQY

chicago

7619 CLARENCE



60631

To: _____
 QSO: _____
 _____ GMT _____ KHz
 RST: _____

73, jeff duntemann

You find out whether you've passed the test before you leave the office. If you passed, you will be given a call sign on the spot, something on the order of WBYXXX. The number indicates the general area of the country, with 9 indicating Indiana, Illinois, and Wisconsin. Ohio and Michigan people get 8's, and people in the west get 0's and 7's. The final three letters are issued sequentially. You can use your license as soon as you get home. No waiting for it to arrive in the mail. I waited eight weeks for my first license, and people used to wait as long as twelve.

Now, what do you do once you get a radio system running? As much as I hate to say it, the format is a little like CB. You listen to a frequency, and if it's not busy, you say something like, "CQ six meters, this is WB9MQY." Somebody else may be listening, and answer you. Then again, they may not. It's your option to move to another frequency and try again. There are several thousand more frequencies to choose from in ham radio than in CB. Hamdom has its own collection of catch-phrases and jargon, some of which are terse and apt, others being just plain silly. It's nothing to compare to the "How 'bout dat Tennessee Toilet Flushin'!!! Breakity-broke you got dun hillbilly Bushwhacker on dun flip-flop looking fer bears 'n seat covers!" wretcn.

No, most of what jargon there is is carried over from abbreviations once used to speed up Morse code communications a little. The familiar "73" (best wishes, see you later, aloha all more or less translate), "88" (love and kisses, addressed to women unless you're stranger than you seem) "CQ" (Is anybody out there?), "QRP" (low power), all are frequently used in voice work. If you're really going to get into Morse code, there are a whole pile of them called "Q signals" (QRP is typical) which approach the CB 10-signals in diversity and occasional weirdness. My old man used to use a Q signal (I have forgotten which it was) which meant "I have to jettison fuel." Pilots of clunky Army planes originated it during WWII; very shortly it came to mean, "I have to go to the bathroom." I doubt there's a Q signal indicating "There is a dead animal in the left lane," but I wouldn't bet my life on it.

Some people chase DX. (That means distance.) Contacting a guy from Outer New Dyspepsia has been known to cause coronary arrest to people who are really into that sort of thing. Of course, you have to remember that a typical 250 watt ham transceiver is capable of spanning the world without straining; the real challenge in working a guy in a strange faraway country lies in getting through the two hundred thousand other US hams who want to talk to him first. Others try to work the world on minimal power; this is more difficult but I find it more rewarding. I worked the Canal Zone with about six watts of power into a clunky crooked old CB antenna; that's what I mean.

Other people collect QSL cards. A QSL is a postcard which is a signed verification that you did in fact talk to a guy on such and such a date on so and so frequency. This is not so crucial when talking to a chap across town, however, it is a matter of life and death if you do in fact contact Mr. Grz Bwkpzwif of Outer New Dyspepsia. Nobody will just take your word for it. But if you have a signed postcard with a map of Outer new Dyspepsia and a little picture of Mr. Bwkpzwif in the corner, people will call you one hell of an operator. Some people (your editor included) have papered entire walls with QSL cards. It beats the pants off paint, or wallpaper with old mill streams on it. My cards and Ewing's card shown here are home-made; Preston's card is an example of commercial printing. Who will be the first to have a roglio QSL with the GT logo in the corner?

Are you fond of



I don't want people to think I'm trying to turn GT into a ham radio club. Far from it. The only real point of this whole special issue of HydroTechnics is that unless we start taking advantage of amateur radio, there will be no Techie Talkies. Once you get your ham license you may want to go deeper into it; then again, you may not. The license gives you the right to experiment with radio communications, legally, within certain restrictions. There's a lot you can do with that license, but you should feel no obligation to use it any further than the GT Techie Talkie project. It's completely up to you. The license is currently free, and it's not nearly as difficult to get as some people think. It can't hurt you to try. And you may well be damned glad you did.

At Marcon we spoke about Tullio's Secret master uv Technology program. Details are not entirely worked out yet, but I will spell out one point we did agree upon: Anyone in this organization who achieves or presently holds a General Class or higher ham license is automatically a SMUT. No further effort needed. You will, or course, be initiated at some con, but once you take the ham ticket home the laurels are yours to place upon your head. So while you're working on your Technician class, bear down a little on Morse code and bring your speed up to 13 wpm. It's the first official, completely-documented path to the lofty heights of SMUTdom. Others will follow, but for my money, this one is the best. 73, gang. I'll see you on the air.



MESKUNITE
COCKTAIL PARTY

73 Magazine, published by wayne Green. By far and away the finest ham radio and tecnie magazine ever put out. Green is the gadfly of ham radio, an intelligent, outrageous man wno will call anybody down on anything, and frequently does in the riotous and deliciously long editorial columns. The magazine is thick, and covers a lot of ground. Green is now pushing microcomputers quite hard, and several articles each month are devoted to personal computing. Lots of construction projects appear each month, and even weird ham fiction like "Glitchgate" by our own George Ewing, wa8wTt. More comprehensible than BYTE and a lot more fun. Also, 73 contains the very best in all the electronic parts ads. If too many complaints come in on a dealer, Green drops him. Subscriptions are fifteen ducks a year. Steep, but I think you get your money's worth.



ME AND THE SHOCKBOX

I built a transmitter before I knew much more about radio than most of you, and it worked the first time I turned it on. I was studying for my Novice license early in 1973, and decided to start work on a transmitter so I'd have something to use when I got the license. There had been an article in Electronics Illustrated (remember them?) called "Build the Mini-Mitter," and I decided to take the article at its word. The most pressing consideration in favor of the Mini-Mitter was that I had virtually all of the parts in my junkbox.

The author (Uncle Tom Kniel, if anybody remembers him) made the Mini-Mitter mini by tossing out such dispensables as the power transformer. The Mini-Mitter ran right off the AC line, dropping the filament voltage for the two tubes through a dropping resistor and creating plate voltage through a voltage doubler circuit. It had a crystal oscillator using a 6AQ5A, followed by a 6V6GT final power amplifier. It used old tuning caps from superhet broadcast radios, of which I had many. The plate tuning coil was to be of something called Miniductor stock, which was a sort of continuous length air-wound coil held together by plastic strips. You cut as much as you needed off a stock length, like sausages off a string. Having no miniductor stock, I wound the coil out of enameled wire on a piece of broomstick. It was ugly broomstick. But I gave it the right number of turns.

I bought a hammertone-finish aluminum minibox down at EDI (which was about the only part I didn't already have) and I put it together. Transmitter construction articles always caution you to keep leads as short and direct as possible. There was so little room inside the minibox that I had practically no choice. I kept leads short, and looked out for short circuits, and that was about the best I could do.

Testing a transmitter is fairly easy. You run some coaxial cable to a light bulb with about the same wattage as you expect your transmitter to produce, and plug it into the antenna jack of the transmitter. If the transmitter in fact generates RF, the light bulb will light. The more RF, the brighter the light.

The Mini-Mitter was supposed to put out about 8 watts, so I rigged a 7 1/2 watt Christmas-tree bulb on some coax and plugged it in. I turned the transmitter on, warmed it up, pressed the telegraph key, and snazzam!!! RF!

I was so snocked I almost croaked.

Which was the first reason I eventually renamed my little transmitter the Shockbox. The other reason is that Uncle Tom Kniel decided to connect one side of the telegraph key directly to the 120V AC line, without benefit of isolation transformer. Handling the telegraph key improperly while the transmitter was plugged in could let one in for another sort of shock entirely.

I eventually got my Novice ticket. And I used the Shockbox for awhile. I got my one and only Rhode Island contact with it, something I have been unable to duplicate using 250 watts of state-of-the-art single sideband voice. I had to stop using it because the AC line frequency modulated the output carrier slightly, making my signal sound rough and rather hummy. Larger electrolytic capacitors in the voltage-doubler circuit would have eliminated that problem, but, alas, there was no more room in the Mini-Mitter box for bigger caps.

The point of all this is that you can indeed build radios out of junk parts. They do work. Maybe not quite the way you want them to, but that's all in the spirit of techie-ing.



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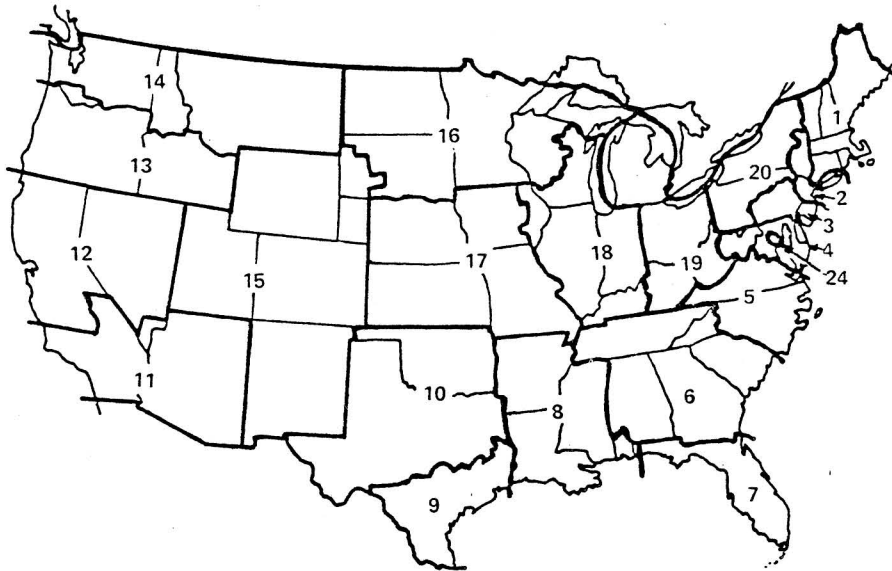
THE PYRO PLAN

In the usual chaotic PyroTechnics fashion, PT has been coming out in bunches after periods of long dormancy. That only reflects the rate of change of my life; when the rate is high, Pyros are few and far between. When things are stable and ticking along, they come thick and fast. The current peaceful era will last up until May 26, when Pyro offices and all our worldly possessions make the big move (7 blocks) into the Duntemanns' First House. This is bound to be at very worst traumatic, and at very best a helluva lot of work. So--Pyro 13 is coming to you hot on the heels of Pyro 12, and if you thought that was something, just wait until you see how quickly Pyro 14 will waitz into your mailbox. It's all a calculated effort to get a few more Pyros into your hands before the Big Disruption.

Pyro 14 will contain a new feature, Mugshot Row, featuring all those mugshots I took at Marcon and will be taking elsewhere. If you have a good mugshot you'd like to appear in Pyro, please send it along. Otherwise you will have to take your chances with the ones I take, and photography is not one of my strong points.

When will Pyro 15 come out? Lord knows. Definitely after we have had a chance to settle into the new place. Don't stop writing, though; it's our only way to keep in touch between cons.





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